

Cell Therapy

Part II: Markets, Companies & Academic Institutions

By

Prof. K. K. Jain
MD, FRACS, FFPM
Jain PharmaBiotech
Basel, Switzerland

April 2018

A Jain PharmaBiotech Report

A U T H O R ' S B I O G R A P H Y

Professor K. K. Jain is a neurologist/neurosurgeon by training and has been working in the biotechnology/biopharmaceuticals industry for several years. He received graduate training in both Europe and USA, has held academic positions in several countries, and is a Fellow of the Faculty of Pharmaceutical Medicine of the Royal College of Physicians of UK. Currently, he is a consultant at Jain PharmaBiotech.

Prof. Jain's 474 publications include 28 books (5 as editor + 22 as author) and 50 special reports, which have covered important areas in biotechnology, gene therapy and biopharmaceuticals. He has also written a textbook of gene therapy which is the first book on this subject to be translated into the Chinese language. A book on gene therapy companies was published in 2000 by John Wiley & Sons and the 2018 version is included in a special report on gene therapy published by Jain PharmaBiotech. Other reports written by Prof. Jain have been published by PJB Publications, D & MD, Reuter's Business Insight, and Decision Resources Inc. Cell Therapy is one of the several in-house publications of Jain PharmaBiotech.

Prof. Jain's recent books include "Handbook of Nanomedicine" (1st ed by Springer 2008, Chinese ed by Peking University Press 2011, 2nd edition 2012, 3rd ed 2017 by Springer), "Textbook of Personalized Medicine" (1st ed by Springer 2009; Japanese edition 2012; 2nd ed Springer 2015), "Handbook of Biomarkers" (Springer 2010; Chinese edition, Chemical Industry Press 2016, 2nd ed 2017), Handbook of Neuroprotection (Springer 2011), Applications of Biotechnology in Cardiovascular Therapeutics (Springer 2011), Applications of Biotechnology in Neurology (Springer 2013), and "Applications of Biotechnology in Oncology" (Springer 2014). He has edited "Applied Neurogenomics" (Springer 2015).

**April 2018 (revised and published continuously since 2001)
Copyright ©2018 by**

**Jain PharmaBiotech
Bläsiring 7
CH-4057 Basel
Switzerland**

**Tel & Fax: +4161-6924461
Email: info@pharmabiotech.ch
Web site: http://pharmabiotech.ch/**

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, or otherwise without the prior written permission of the Publisher. This report may not be lent, resold or otherwise traded in any manner without the consent of the Publisher. While all reasonable steps have been taken to ensure the accuracy of the information presented, the Publisher cannot accept responsibility for inadvertent errors or omissions.

TABLE OF CONTENTS

10. Markets and Future Prospects for Cell Therapy	6
Introduction	6
Methods for estimation of cell therapy markets.....	6
Potential markets for cell therapy.....	7
Markets according to technologies.....	7
<i>Stem cell transplants.....</i>	7
<i>Supporting cell technologies.....</i>	8
<i>Blood transfusion market.....</i>	8
<i>Cord blood collection and storage.....</i>	8
Cell therapy and related technologies	8
Cell therapy markets according to therapeutic areas	8
<i>Bone and joint disorders</i>	9
<i>Cancer.....</i>	9
<i>Cardiovascular disorders.....</i>	10
<i>Diabetes mellitus</i>	10
<i>Liver disorders.....</i>	11
<i>Neurological disorders</i>	11
<i>Retinal degenerative diseases market.....</i>	12
<i>Skin and wound care</i>	12
<i>Urinary incontinence.....</i>	12
<i>Reconstruction of teeth by stem cell implants.....</i>	12
Market size according to geographical areas	13
Unmet market needs in cell therapy	14
Drivers of growth of cell therapy markets	14
Role of stem cells in regenerative medicine	14
Role of cells in markets for artificial organs	15
Increase of R&D expense on cell therapy	15
Increased used of cell-based drug discovery.....	15
Impact of emerging healthcare trends on cell therapy markets	15
Markets for cell therapy tourism	15
Involvement of pharmaceutical companies in cell therapy	16
Future prospects of cell therapy	16
Stem cell research around the world	16
Stem cell research in China	17
Consortia for ESC research in Europe	17
<i>EuroStemCell</i>	17
<i>UK National Stem Cell Network.....</i>	18
Ethical concerns about commercialization of embryonic stem cells	18
Education of the physicians	18
Public education.....	19
NIH support of stem cell research	19
Funding of stem cell research from non-federal sources.....	19
Prospects of venture capital support for stem cell companies.....	21
Cell therapy in the developing countries.....	21
Guidelines for stem cell therapies.....	22
Business strategies.....	23
Formation of networks.....	23
Market potential of autologous vs allogeneic cells.....	24
Future market potential of adult vs embryonic stem cells	24
Transportation and handling of cell therapy products.....	24
Translating science into business	25
11. Companies Involved in Cell Therapy	26
Introduction	26
Profiles of selected companies.....	28
Collaborations.....	359
12. Academic Institutions	368
Introduction	368
Stem cell center.....	368
Profiles of institutions	369
Collaborations.....	458
13. References	462

Tables

Table 10-1: Market size according to cell therapy and related technologies 2017-2027	7
Table 10-2: Market size according to therapeutic areas for cell therapy in 2017-2027	9
Table 10-3: Cell therapy markets for cardiovascular disorders in 2017-2027	10
Table 10-4: Values of cell therapies for neurological disorders in 2017-2027	11
Table 10-5: Total cell therapy market in 2017-2027 according to geographical areas	13
Table 10-6: Cord blood market according to geographical areas 2017-2027	13
Table 10-7: Stem cells transplant market according to geographical areas 2017-2027	13
Table 10-8: SWOT Autologous cells vs allogeneic cells.....	24
Table 11-1: Publicly traded cell therapy companies	26
Table 11-2: Selected collaborations of cell therapy companies.....	359
Table 12-1: Therapeutic uses of stem cells	376
Table 12-2: Commercial collaborations of US academic institutes relevant to stem cells	458

Figures

Figure 10-1: Unmet needs in cell therapy	14
--	----